CLAIMS

1. Nucleic acid comprising at least one segment of the gene encoding a functional portion or the gene-regulating region of the alpha 2 subunit of the Na,K pump (ATPase, ATP1A2) for use in the diagnosis of pathologies associated with migraine or with alternating hemiplegia of the childhood.

2. Nucleic acid comprising at least one segment of the gene encoding a functional portion or the gene-regulating region of the alpha 2 subunit of the Na,K pump (ATPase, ATP1A2) for use in genetic therapy for pathologies associated with migraine or with alternating hemiplegia of the childhood.

3. Method to detect in an individual at least one mutation in the gene encoding the alpha 2 subunit of the Na,K human pump (ATPase, ATP1A2) located on chromosome1, associated with migraine disorders, which comprises the steps of:

- collecting a sample containing a sufficient quantity of the individual's DNA or that is reproducible in culture;
- isolating of the DNA from the sample;
- exponential amplifying the DNA using as an oligonucleotide pair for the amplification reaction at least two oligonucleotides that are able to amplify at least one segment of the gene encoding the alpha 2 subunit of the Na,K human pump (ATPase, ATP1A2) or a segment of the region regulating it;
- detecting in at least one amplified segment any mutations compared with a healthy control.

4. Method according to claim 3 in which the oligonucleotide pairs are:

17	AGTCCCTCTGACCTCCCTGAT	CCACTGTGCCATCACGATT
19	CTTCTGCTTCCTGCTCTGACC	ACACATGTGCGCTGTGTTTAC.

5. Method according to claim 3 in which the DNA exponential amplification phase is performed using oligonucleotide pairs that are able to amplify the entire encoding portion of the gene encoding the alpha 2 subunit of the Na,K human pump (ATPase, ATP1A2).

6. Method according to claim 5 in which the DNA exponential amplification phase to amplify the entire portion encoding the gene for the alpha 2 subunit

of the Na,K human pump (ATPase, ATP1A2) comprises the use of at least one of the following oligonucleotide pairs:

1	TGTTGCTTTGGCTTTCTCTGT	CTCCCTCACCCTCTAGACTGC
2+3	CCCCTCTCTTCCCTGACTCT	GCCTCTTTTGTTCCTTCCCTA
4	ATGGTGACTGGCTGGGTTG	CAGGGTTGGAGGACAGTCAC
5	AGCTGCCCCTTTAGGGTTG	ACCTTACAGCCTAGCCCAGAG
6	GAGACCAGCAGGAGAAGAAGG	AGACTCAACTGCTTGCTCTGG
7	TACAAGTGGCTCTGCCAGTCT	AGCCCTTCATCCTGACTATGG
8	CAGGAAATAGGATGGGACTGC	GTAGTGAGACCCTCCCCTGGT
9	ATCTCCGGCTTCAGCCTTAAC	TAATCCTATCCACCCCCTCTG
10+11	CTCCTGGTTCCCCCTCAT	TCCCTCTCTCTTCCTCTGTCC
12	GCGCTACCAAGACAAGTATGG	CTTGGGAATCCCCTTCTGAG
13	GAAGCCACTCTGCGGATCT	ACTGCAGCTCCTTGAACTCTG
14	GGAGGGGGATAAACCCTTAAT	GACGTGTTGATTAGGGCACAG
15	AGGGGTCAGCTGTCTCTGTC	GGTCCCTGCCTGTCATCTG
16	AAGGGGTTTCGTCCTCAAGT	TCAGTATCCTGCAAACCATCC
17	AGTCCCTCTGACCTCCCTGAT	CCACTGTGCCATCACGATT
18	TCATCTCCTACGTCCCTTCAA	AGCTGGGAAAAGAACCCTGT
19	CTTCTGCTTCCTGCTCTGACC	ACACATGTGCGCTGTGTTTAC
20	CCTCCGACACTCTCATCTGTC	CTGTGTGGGTTGGTGAGTGT
21	CTTCACCTGCCACCTCCTT	CCCCCGTATGACTACTCAGG
22	CGCTTTGAATGCTCCTTTATG	GAGGGAGGAGCTGGTGGT
23	GCCTCCTTTTAAGCTCATGCT	GCCTCATTATCTCTCCCCAAA

7. Method according to claim 3 in which the DNA exponential amplification phase is performed using oligonucleotide pairs that are able to amplify the regulating region of the gene encoding the alpha 2 subunit of the Na,K human pump (ATPase, ATP1A2).

8. Method according to claim 7 in which the DNA exponential amplification phase to amplify the regulating region of the gene encoding the alpha 2 subunit of the Na,K human pump (ATPase, ATP1A2) comprises the use of the following oligonucleotide pairs:

1_Pr	TTCCCCTCACTCCATCTCTG	GACCCCTGCTCTTTAGGGATA
2_Pr	GATTCAGGACCACTCCATCC	GGGAACAGTCAGAGGACAGG.

9. Method according to the aforementioned claims in which the detection phase of at least one amplified segment with any mutations compared with a healthy control is performed using direct sequencing or an SSCP method (single strand conformation polymorphism) (17) DHPLC or DGGE (denaturing gradient gel electrophoresis) (18).

10. Diagnostic kit for pathologies associated with migraine or with alternating hemiplegia of the childhood to carry out the method according to claims 3 through 9, that comprises:

- at least one pair of oligonucleotides for the exponential amplification reaction of at least one segment of the gene encoding the alpha 2 subunit of the Na,K human pump (ATPase, ATP1A2), in which the aforesaid segment encodes a functional portion or a gene-regulating portion of the aforesaid subunit;
- a control DNA from a non affected individual.

11. Kit according to claim 10 in which the oligonucleotide pairs for the amplification reaction are able to amplify the entire encoding region of the gene encoding the alpha 2 subunit of the Na,K human pump (ATPase, ATP1A2).

12. Alpha 2 subunit protein of the Na,K human pump (ATPase, ATP1A2) or a functional portion thereof for use in the diagnosis of pathologies associated with migraine or with alternating hemiplegia of the childhood.

13. Alpha 2 subunit protein of the Na,K human pump (ATPase, ATP1A2) or a functional portion thereof for use in the treatment of pathologies associated with migraine.

14. Method for the identification of an agonist or antagonist agent of the Na,K human pump (ATPase, ATP1A2) or a functional portion or a gene-regulating portion of the subunit, that comprises:

(i) transfection of a cell line with a gene for a mutant isoform of the Na,K human pump (ATPase, ATP1A2) resistant to ouabain;

(ii) appropriate exposure of the transfected cells to the agent;

(iii) measurement of the Na,K pump activity in relation to ion transport with labeled ions.

15. Method for the identification of an agonist or antagonist agent of the Na,K pump (ATPase, ATP1A2) or a functional portion, that comprises the phases:

(i) use of the agent to treat a transgenic animal that expresses a mutant isoform of the Na,K pump (ATPase, ATP1A2) or that is partially or completely deleted in the gene encoding the Na,K pump (ATPase, ATP1A2) or

(ii) use of the agent to treat eukaryotic or prokaryotic cell lines that express mutant or normal forms of the Na,K pump (ATPase, ATP1A2) by transient or stable transfection or in physiological conditions.